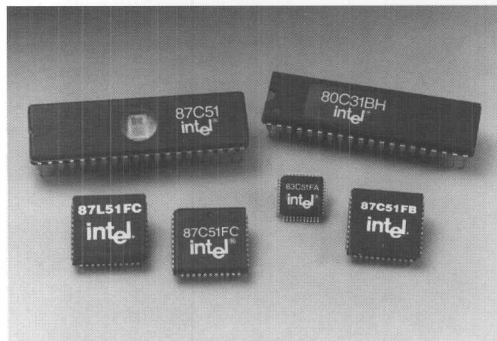


# MCS<sup>®</sup> 51 Microcontroller Architecture

## PRODUCT OVERVIEW



Intel's 8-bit MCS<sup>®</sup> 51 family of microcontrollers has become an industry standard for embedded control. The architecture is optimized for control-oriented applications. Intel offers a wide variety of 8-bit microcontrollers with various versions of on-board EPROM and ROM memory as well as CPU only. As a result, Intel gives you the ability to meet your specific application needs by offering EPROM, one-time programmable (OTP), ROMless and ROM-based microcontrollers. The HMOS 8051 family is often used for cost sensitive designs while the 80C51 family, which utilizes Intel's proven CHMOS technology provides lower power, higher integration and higher performance.

## PACKAGING

- Packaging options include:
- Plastic Leaded Chip Carrier (PLCC)
- Plastic Dual In-Line (PDIP)
- Plastic Quad Flat Pack (PQFP)
- Windowed CERDIP

## KEY FEATURES

- 8-bit CPU optimized for control applications
- Extensive Boolean processing (single bit) capabilities
- 64K Program Memory address space
- 64K Data Memory address space
- On-chip Program Memory (Up to 32 Kbytes)
- On-chip Data RAM (Up to 256 bytes)
- Bidirectional and individually addressable I/O lines
- Full duplex UART

## NEW PRODUCTS

### 8XL51FA/FB/FC

The 8XL51FA/FB/FC is a 3V/3.3V version of the current 8XC51FA/FB/FC and will operate from 2.7V to 3.6V to the maximum frequency of 20 MHz for commercial temperature range and 16 MHz for express temperature range. It is functionally and performance compatible with the 5V 8XC51FA/FB/FC product line. The 3V/3.3V version offers the advantages of much lower power consumption, improved noise levels and enhanced protection features.

### 8XL52/L54/L58

The 8XL52/L54/L58 is the 3V/3.3V version of the current 8XC52/C54/C58 and will operate from 2.7V to 3.6V to the maximum frequency of 20 MHz for commercial temperature range and 16 MHz for express temperature range. It is functionally and performance compatible with the 5V 8XC52/C54/C58 product line. The 3V/3.3V version offers the advantages of much lower power consumption, improved noise levels and enhanced protection features.

### 87C51SL

The 87C51SL provides a single chip keyboard controller to the notebook PC application. Both 5V in PQFP package and 3.3V in SQFP package are available with a newly introduced OTP EPROM option. It is used in conjunction with the Intel486<sup>™</sup> SL-enhanced processor based design.

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# MCS<sup>®</sup> 51 Microcontroller Family Product Line

PRODUCT	ROM/EPROM FLASH	RAM	TIMER/ COUNTERS	I/O PINS	MAX SPEED (MHz)	PROCESS	PACKAGE	SECURITY	KEY FEATURES
<b>8051 PRODUCT LINE</b>									
8031AH	ROMLESS	128	2	32	12	HMOS	P, N, D	N/A	BOOLEAN PROCESSING
8051AH	4K ROM	128	2	32	12	HMOS	P, N, D	P	BOOLEAN PROCESSING
8751H	4K EPROM	128	2	32	12	HMOS	D	L1	ONE LEVEL MEMORY LOCK
8751BH	4K EPROM	128	2	32	12	HMOS	P, N	L2	TWO LEVEL MEMORY LOCK
<b>8052 PRODUCT LINE</b>									
8032AH	ROMLESS	256	3	32	12	HMOS	P, N, D	N/A	THREE TIMER COUNTERS
8052AH	8K ROM	256	3	32	12	HMOS	P, N, D	NO	THREE TIMER COUNTERS
8752BH	8K EPROM	256	3	32	12	HMOS	P, N, D	L2	TWO LEVEL MEMORY LOCK
<b>80C51 PRODUCT LINE</b>									
80C31BH	ROMLESS	128	2	32	12, 16	CHMOS	P, N, D, S	N/A	POWER SAVE MODES
80C51BH	4K ROM	128	2	32	12, 16	CHMOS	P, N, D, S	P	POWER SAVE MODES
87C51	4K EPROM	128	2	32	12, 16, 20	CHMOS	P, N, D, S	L3	TWO LEVEL MEMORY LOCK
<b>8XC52/C54/C58 PRODUCT LINE</b>									
80C52	ROMLESS	256	3	32	12, 16, 20, 24i	CHMOS	P, N, S	N/A	UP/DOWN TIMER/COUNTER
80C52	8K ROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, S	L1	UP/DOWN TIMER/COUNTER
87C52	8K EPROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, D, S	L3	UP/DOWN TIMER/COUNTER
80C54	16K ROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, S	L1	UP/DOWN TIMER/COUNTER
87C54	16K EPROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, D, S	L3	UP/DOWN TIMER/COUNTER
80C58	32K ROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, S	L1	UP/DOWN TIMER/COUNTER
87C58	32K EPROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, D, S	L3	UP/DOWN TIMER/COUNTER
<b>8XL52/L54/L58 PRODUCT LINE</b>									
80L52	8K ROM	256	3	32	12, 16, 20*	CHMOS	N, S	L1	LOW VOLTAGE PART, 2.7V TO 3.6V
87L52	8K OTP	256	3	32	12, 16, 20*	CHMOS	N, S	L3	LOW VOLTAGE PART, 2.7V TO 3.6V
80L54	16K ROM	256	3	32	12, 16, 20*	CHMOS	N, S	L1	LOW VOLTAGE PART, 2.7V TO 3.6V
87L54	16K OTP	256	3	32	12, 16, 20*	CHMOS	N, S	L3	LOW VOLTAGE PART, 2.7V TO 3.6V
80L58	32K ROM	256	3	32	12, 16, 20*	CHMOS	N, S	L1	LOW VOLTAGE PART, 2.7V TO 3.6V
87L58	32K OTP	256	3	32	12, 16, 20*	CHMOS	N, S	L3	LOW VOLTAGE PART, 2.7V TO 3.6V
<b>8XC51FA/FB/FC PRODUCT LINE</b>									
80C51FA	ROMLESS	256	3	32	12, 16, 20, 24i	CHMOS	P, N, S	N/A	PROGRAMMABLE COUNTER ARRAY (PCA)
83C51FA	8K ROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, S	L1	PROGRAMMABLE COUNTER ARRAY (PCA)
87C51FA	8K EPROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, D, S	L3	PROGRAMMABLE COUNTER ARRAY (PCA)
83C51FB	16K ROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, S	L1	PROGRAMMABLE COUNTER ARRAY (PCA)
87C51FB	16K EPROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, D, S	L3	PROGRAMMABLE COUNTER ARRAY (PCA)
83C51FC	32K ROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, S	L1	PROGRAMMABLE COUNTER ARRAY (PCA)
87C51FC	32K EPROM	256	3	32	12, 16, 20, 24i	CHMOS	P, N, D, S	L3	PROGRAMMABLE COUNTER ARRAY (PCA)
<b>8XL51FA/FB/FC PRODUCT LINE</b>									
80L51FA	ROMLESS	256	3	32	12, 16, 20*	CHMOS	N, S	N/A	LOW VOLTAGE PART, 2.7V TO 3.6V
83L51FA	8K ROM	256	3	32	12, 16, 20*	CHMOS	N, S	L1	LOW VOLTAGE PART, 2.7V TO 3.6V
87L51FA	8K OTP	256	3	32	12, 16, 20*	CHMOS	N, S	L3	LOW VOLTAGE PART, 2.7V TO 3.6V
83L51FB	16K ROM	256	3	32	12, 16, 20*	CHMOS	N, S	L1	LOW VOLTAGE PART, 2.7V TO 3.6V
87L51FB	16K OTP	256	3	32	12, 16, 20*	CHMOS	N, S	L3	LOW VOLTAGE PART, 2.7V TO 3.6V
83L51FC	32K ROM	256	3	32	12, 16, 20*	CHMOS	N, S	L1	LOW VOLTAGE PART, 2.7V TO 3.6V
87L51FC	32K OTP	256	3	32	12, 16, 20*	CHMOS	N, S	L3	LOW VOLTAGE PART, 2.7V TO 3.6V
<b>8XC51GB PRODUCT LINE</b>									
8XC51GB	ROMLESS	256	3	48	12, 16	CHMOS	N1	N/A	8 CHANNEL 8-BIT A/D, 2 PCA, 6 I/O PORTS
83C51GB	8K ROM	256	3	48	12, 16	CHMOS	N1	L1	8 CHANNEL 8-BIT A/D, 2 PCA, 6 I/O PORTS
87C51GB	8K EPROM	256	3	48	12, 16	CHMOS	N1	L3	8 CHANNEL 8-BIT A/D, 2 PCA, 6 I/O PORTS
<b>8XC152 PRODUCT LINE</b>									
80C152JA	ROMLESS	256	2	40	16.5	CHMOS	P1, N1	N/A	MULTI-PROTOCOL SERIAL COMMUNICATION
80C152JB	ROMLESS	256	2	56	16.5	CHMOS	N1	N/A	MULTI-PROTOCOL SERIAL COMMUNICATION
83C152JA	8K ROM	256	2	40	16.5	CHMOS	P1, N1	NO	MULTI-PROTOCOL SERIAL COMMUNICATION
<b>8XC51SL PRODUCT LINE</b>									
80C51SL-AH	ROMLESS	256	2	87	16	CHMOS	KU	NO	CUSTOMIZABLE KEYBOARD CONTROL
81C51SL-AH	16K ROM 1	256	2	87	16	CHMOS	KU	NO	CUSTOMIZABLE KEYBOARD CONTROL
83C51SL-AH	16K ROM 2	256	2	87	16	CHMOS	KU	NO	CUSTOMIZABLE KEYBOARD CONTROL
87C51SL-AH	16K OTP	256	2	87	16	CHMOS	KU	NO	CUSTOMIZABLE KEYBOARD CONTROL
80C51SL-AL	ROMLESS	256	2	87	16	CHMOS	SB	NO	LOW VOLTAGE VERSION, 3V TO 3.6V
81C51SL-AL	16K ROM 1	256	2	87	16	CHMOS	SB	NO	LOW VOLTAGE VERSION, 3V TO 3.6V
83C51SL-AL	16K ROM 2	256	2	87	16	CHMOS	SB	NO	LOW VOLTAGE VERSION, 3V TO 3.6V
87C51SL-AL	16K OTP	256	2	87	16	CHMOS	SB	NO	LOW VOLTAGE VERSION, 3V TO 3.6V

PACKAGES: P = 40 PDIP, N = 44 PLCC, S = 44 QFP (QUAD FLAT PACK), KU = 100 QFP, D = 40 CERDIP, N1 = 68LD PLCC, P1 = 48LD PDIP, SB = 100 SQFP

SECURITY: P = PROTECTED, L1 = 1 LOCK BIT, L2 = 2 LOCK BITS, L3 = 3 LOCK BITS

SPEED: 24i = 24 MHz INTERNAL-ONLY OPERATION, 20\* = 20 MHz AVAILABLE FOR COMMERCIAL TEMPERATURE RANGE ONLY.

ROM: ROM 1 = STANDARD ROM CODE, ROM 2 = CUSTOMIZABLE ROM CODE

NOTE: PROGRAMMABLE COUNTER ARRAY (PCA) ALLOWS CONFIGURATIONS OF PWM'S, COMPARE/CAPTURE MODULES, HIGH SPEED OUTPUTS, WATCH DOG TIMER

## Intel Reference Numbers

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